

REMARKS

Applicant appreciates the Examiner's thorough consideration provided the present application. Claims 1, 4-7, and 10-23 are now present in the application. The title, the abstract, the specification, and claims 1, 4-7 and 10 have been amended. Claims 11-23 have been added. Claims 2, 3, 8 and 9 have been cancelled. Claims 1 and 13 are independent. Reconsideration of this application, as amended, is respectfully requested.

Specification

The title, the abstract, and the specification have been amended for a better understanding and clarification of the present invention. In particular, the term "substrate" has been changed to "stack frame"; the term "integrated circuit assembly" has been changed to "chip scale package". Applicant respectfully submits that the originally filed figures of the present invention fully support the amended terms because one skilled in the art would easily refer to the elements in the figures of the present invention to recognize the noted elements. Accordingly, Applicant respectfully submits that no new matter is entered.

Claim Objection

Claim 10 has been objected to due to the lack of antecedent basis. Claim 10 has been amended to address the Examiner's requested correction.

Accordingly, this objection has been obviated and/or rendered moot. Reconsideration and withdrawal of this objection are respectfully requested.

Claim Rejections Under 35 U.S.C. § 102

Claims 1, 3, 5, 6, 8 and 9 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Chun, U.S. Patent No. 6,407,629. This rejection is respectfully traversed.

In light of the foregoing amendments to the claims, Applicant respectfully submits that this rejection has been obviated and/or rendered moot. As the Examiner will note, independent claim 1 has been amended to recite a combination of elements including “the stack frame having a through hole in the center of a upper surface of the stack frame through the upper surface and a lower surface of the stack frame”. Applicant respectfully submits that the above combination of elements as set forth in amended independent claim 1 is not disclosed nor suggested by the Chun reference relied on by the Examiner.

Chun discloses a stackable ball grid array (BGA) package. In particular, Chun teaches the BGA package is disposed in the supporting member 21 to be a unit, and a plurality of units 100, 110, 120 and 130 are stacked through the conductive balls 8a, the metal traces 24a, and the connecting portions 24b at the bottom of the supporting member 21 (see FIGs. 2-4 and 5A).

As the Examiner correctly indicated, Chun fails to teach a through hole at the center of the supporting member 21.

Since Chun fails to teach each and every limitation of amended independent claim 1, Applicant respectfully submits that claim 1 and its dependent claims clearly define over the teachings of Chun. Accordingly, reconsideration and withdrawal of the rejection under 35 U.S.C. § 102 are respectfully requested.

Claim Rejections Under 35 U.S.C. § 103

Claims 2 and 4 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Chun in view of Farnworth, U.S. Patent No. 6,020,629. Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Chun in view of Brandenburg, U.S. Patent Publication No. US2004/0113281 A1. Claim 10 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Chun in view of Harada, U.S. Patent Publication No. US2001/0054481 A1. These rejections are respectfully traversed.

As mentioned above, amended independent claim 1 recites “the stack frame having a through hole in the center of a upper surface of the stack frame through the upper surface and a lower surface of the stack frame”. Applicant respectfully submits that the above combination of elements as set forth in amended independent claim 1 is not disclosed nor suggested by the references relied on by the Examiner.

As mentioned above, Chun fails to teach a through hole at the center of the supporting member 21.

With regard to the Examiner's reliance on Farnworth, although the Examiner indicated that Farnworth discloses a through hole in the center of the stack frame, Applicant respectfully submits that Farnworth teaches away from the combination with Chun and one of ordinary skill in the art would not have been motivated to modify Chun in view of Farnworth for the reasons described hereinbelow.

Farnworth discloses a stacked semiconductor package. In particular, Farnworth teaches a structure in FIG. 2A for receiving a die 20 on a substrate 12 and a plurality of the structures are stacked (see FIG. 2D). Farnworth also teaches a through hole in the center of the structure in FIG. 2A. However, by applying Farnworth's through hole to modify Chun's supporting member 21, it would destroy the primary purpose of Chun's supporting member 21 to stack and electrically connect a plurality of supporting members 21.

More specifically, the supporting members 21 of Chun are stacked and electrically connected through the conductive balls 8a, the metal traces 24a, and the connecting portions 24b at the bottom of the supporting member 21. By applying Farnworth's through hole to modify Chun's supporting member 21, the semiconductor chips 1 in Chun's supporting members 21 cannot be electrically connected together through the conductive balls 8a, the metal traces 24a, and the connecting portions 24b because the through hole would take the space originally for the metal traces 24a and the connecting portions 24b.

Accordingly, Applicant respectfully submits that Farnworth teaches away from the combination with Chun and one of ordinary skill in the art would not have been motivated to modify Chun in view of Farnworth.

With regard to the Examiner's reliance on Brandenburg and Harada, these references have only been relied on for their teachings of the air vent and the cavity. These references also fail to disclose the above combination of elements as set forth in amended independent claim 1. Accordingly, these references fail to cure the deficiencies of Chun.

Accordingly, none of the references utilized by the Examiner individually or in combination teach or suggest the limitations of amended independent claim 1 or its dependent claims. Therefore, Applicant respectfully submits that all of these claims clearly define over the teachings of the references relied on by the Examiner.

Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103 are respectfully requested.

Additional Claims

Additional claims 11-23 have been added for the Examiner's consideration.

Applicant respectfully submits that claims 11 and 12 are allowable due to their respective dependence on independent claim 1, as well as due to the additional recitations included in these claims.

Independent claim 13 has been added to recite “the second chip scale package being contacting the first chip scale package”. Applicant respectfully submits that the above combination of elements as set forth in new independent claim 13 is not disclosed nor suggested by the references relied on by the Examiner. Support of the above combination of elements can be found in FIGs. 6 and 7.

To further clarify the present invention, Applicant respectfully submit that claim 13 provides for a compact design which can stack at least two chip scale packages in a single stack frame. This space-saving feature is not found in the structures disclosed in the utilized prior art.

In particular, Chun fails to teach the above combination of elements recited in new independent claim 13 because the BGA packages are stacked via their respective supporting members 21 without contacting the other BGA packages. In fact, the BGA packages 100-130 are separated by the bottom of their respective supporting members 21 (see FIG. 4).

Farnworth also fails to teach the above combination of elements recited in new independent claim 13. As shown in FIG. 2D of Farnworth, the dies 20 are stacked via their respective structures (the upper portion of 14 and the lower portion of 14) with contacting each other. In fact, the dies are separated by the gap between the upper portion of 14 and the lower portion of 14 shown in FIG. 2D.

With regard to Brandenburg and Harada, these references also fail to disclose the above combination of elements as set forth in new independent

claim 13. Accordingly, these references fail to cure the deficiencies of Chun and Farnworth.

Accordingly, it is believed that independent claim 13 and its dependent claim 14-23 are in condition for allowance.

Favorable consideration and allowance of additional claims 11-23 are respectfully requested.

CONCLUSION

Since the remaining patents cited by the Examiner have not been utilized to reject the claims, but rather to merely show the state of the art, no further comments are necessary with respect thereto.

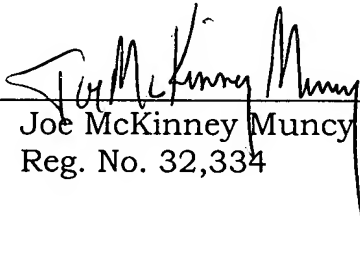
It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

In the event there are any matters remaining in this application, the Examiner is invited to contact Joe McKinney Muncy, Registration No. 32,334 at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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